E. Remarks

Claims 1, 2, 7 and 21 are presented for consideration. Claims 3-6, 8-12 and 22-29 are pending but withdrawn from consideration following a restriction requirement.

Claim 1 is amended to more distinctly describe the subject matter of applicant's invention. No new matter is added by these amendments and the amendments are not intended to affect the scope of the claims.

F. Drawings

Substitute formal drawings are enclosed with this response correcting the deficiency noted in the Office Action. It is respectfully requested that the Objection be withdrawn.

G. Rejection under 35 U.S.C. 112

Claims 1, 2, 7 and 21 were rejected under 35 U.S.C. 112 based on the use of the term "quantum confined" and "nanomaterial."

It is respectfully believed that the term "quantum confined" is a term of art that was well-established at the time the instant invention was made. For example, US Patent 5,170,226 (Fukuzawa et al., Issue Date: December 8 1992) in column 1, lines 20-50 provides a detailed definition. For convenience, this is recited below (emphasis added).

> "Electrons confined in a potential well whose size is comparable to that of the de Broglie wavelength of an electron behave quite differently from those in free space. This special behavior is called the ***quantum confined*** effect. One-dimensional confinement restricts the freedom of electron motion in a two-dimensional plane. Two-dimensional confinement allows only one-dimensional motion of carriers: a structure with this feature is called a quantum wire or quantum well wire. Three-dimensional confinement does not allow kinetic motion of electrons, for example, in any direction. This electronic state is similar to that which exists in atoms. An electron in this

state is called a zero-dimensional electron and a structure that gives rise to this state is called a quantum dot or quantum box.

The difference in the dimensionality of these electrons causes quite a big difference in their density of states and electronic energy levels. Moreover, a remarkable improvement can be expected in the performance of devices that use the feature of electron kinematics in quantum structures of less than three dimensions. For example, electron mobility affects the speed of an electronic device and its power consumption. This mobility is subject to electron scattering processes in semiconductors.

Similarly, while the term "nanomaterial" is also a term of art, the claim 1 has been amended to use a term "nanocomposite" to more closely mirror the language appearing in the specification. The term "nanocomposite" is described and reduced to practice in the specification (see Examples 3 and 4 of the specification on pages 14-16). Lines 11 through 25 on page 10 describe methods for producing quantum confined material compositions; Examples 3 and 4 of the specification on pages 14-16 provide the descriptive illustration of these methods taught on page 10.

H. Rejection based on Shigekuni

Claims 1 and 2 were rejected under 35 U.S.C. 102 and 35 U.S.C. 103 based upon Shigekuni. This rejection is respectfully traversed. Claim 1 calls for, among other things, an electroded device having at least one layer that comprises a quantum-confined nanocomposite. At least these features of claim 1 are not shown or suggested in the relied on reference.

Shigekuni (JP 08261979) teaches nanometer scale layers; however, layers of single phase silicon oxide are very different than a composite that comprises quantum confined materials. An exemplary definition of "composite" is:

> a solid material which is composed of two or more substances having different physical characteristics and in which each substance retains its identity while contributing desirable properties to the whole... (Merriam-Webster's Collegiate Dictionary,

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This definition of composite is consistent with the use of the term in the specification. See, e.g., examples 3 and 4. By definition, then, a composite comprises more than one substance, for example, more than one phase of a particular material, or more than one materials. Accordingly, the nanocomposite of claim 1 calls for a device have at least one layer that comprises more than one substance (i.e., a nanocomposite) within that layer. Each layer in Shigekuni appears to comprise a single substance. Moreover, Shigekuni does not teach quantum confined materials in a nanocomposite form or devices based thereon. Shigekunie does not offer any motivation or suggestion of such a structure.

For at least these reasons, claim 1 and claim 2 that depends from claim 1 are believed to be neither anticipated nor made obvious by Shigekuni.

I. Rejection based on Chen et al in view of Barbee, Jr. et al.

Claim 1 was rejected under 35 U.S.C. 103 based upon Chen et al. in view of Barbee, Jr. et al. This rejection is respectfully traversed. Claim 1 calls for, among other things, a laminated structure, wherein at least one layer comprises a quantum-confined nanocomposite. At least these features of claim 1 are not shown or suggested in the relied on references alone or in combination.

As noted in the Office Action, Chen et al. do not show nanocomposite layers. Further, each layer is a single substance, and therefore there is not a layer that comprises a nanocomposite. Further still, there is no hint or suggestion to use a quantum confined material in any layer. Barbee, Jr. et al. do not supply these deficiencies of the Chen et al. reference. Accordingly, Chen et al. or Barbee et al. or combination thereof do not teach quantum confined materials in a nanocomposite form as called for in claim 1, nor do the references show or suggest devices comprising the material combination of claim 1.

J. Rejection based on Hoenig et al, Cheng et al., Sibbald et al. or Voit

Claims 1, 2 and 7 were rejected under 35 U.S.C. 102 and 35 U.S.C. 103 based upon Hoenig et al, Cheng et al., Sibbald et al. or Voit. These rejections are

respectfully traversed. Claim 1 calls for, among other things, a laminated structure, wherein at least one layer comprises a quantum-confined nanocomposite. At least these features of claim 1 are not shown or suggested in the relied on references alone or in combination.

It is respectfully believed that Hoenig et al. do not teach quantum confined materials in a nanocomposite form or devices based on quantum confined materials in a nanocomposite form. It is not clear that the Office Action even states a prima facie case of anticipation or obviousness with respect to Hoenig et al. in that the Office Action does not allege that the reference shows a quantum-confined layer. It should be noted that "confined with respect to the sensor structure" is not the same as "quantum confined". Hoenig et al. do not offer motivation or suggestion, nor does the Office Action state any such motivation, that would lead one to make a device having a laminated structure, wherein at least one layer comprises a quantum-confined nanocomposite.

Cheng et al. teach a hydrogen sensor having multiple homogenous layers, not composite layers. There is no teaching or suggestion to provide any layer as a composite or nanocomposite. Moreover, Cheng et al. do not teach quantum confined materials in a nanocomposite form or devices based thereof. Cheng et al provide no motivation or suggestion that would lead one to use the materials called for in claims 1, 2 and 7. Further, the Office Action does not state a prima facie case of anticipation or obviousness in that the rejection fails to state that Cheng et al. show a quantum-confined material in a nanocomposite form.

Sibbald et al. teach a device using silicon oxide and porous structures thereof, but do not teach quantum confined materials in a nanocomposite form or devices based thereon. Sibbald et al. do not offer motivation or suggestion of such an structure. Further, the Office Action does not state a prima facie case of anticipation or obviousness in that the rejection fails to state that Sibbald et al. show a quantum-confined material in a nanocomposite form.

Voit et al. insightfully teach the application of tungsten oxide and films, but do not show or suggest quantum confined materials in a nanocomposite form. Like the

other references, each of the layers in Voit et al. are homogenous, not composite, and the reference is silent with respect to quantum confined materials. Voit et al. do not show or suggest devices comprising a laminated structure, wherein at least one layer comprises a quantum-confined nanocomposite, and does not offer motivations or suggestions of such an invention.

K. Rejection based on Neuburger

Claims 1, 2 and 21 were rejected under 35 U.S.C. 103 based upon Neuburger. This rejection is respectfully traversed. Claim 1 calls for, among other things, a laminated structure, wherein at least one layer comprises a quantum-confined nanocomposite. At least these features of claim 1 are not shown or suggested in the relied on references alone or in combination.

The Office Action notes that Neuburger does not teach quantum confined materials or electroded devices. It should be noted that "confined to a region on the crystal" is not the same as or similar to the claim limitation of "quantum confined", nor would the disclosure of zinc confined to a region on the crystal provide any motivation to use a quantum confined material. Accordingly, Neuburger does not show or suggest devices comprising a laminated structure, wherein at least one layer comprises a quantum-confined nanocomposite, and does not offer motivations or suggestions of such an invention.

L. Conclusion

In view of the above, claims 1, 2, 7 and 21 are believed to be allowable and the case in condition for allowance which action is respectfully requested. The references that were cited but not relied upon are no more relevant that those references that were relied upon. Should the Examiner anticipate any action other than allowance, the courtesy of a telephone interview is requested so that the case can be moved forward as efficiently as possible. No fee is believed to be required by this response as determined on the accompanying transmittal letter. Should any other fee be required, please charge Deposit 50-1123. Should any extension of time be required please consider this a petition therefore and charge the required fee to

Deposit Account 50-1123

Respectfully submitted,

Date: June 27, 2003

BY: _____

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